Observations and Concerns:

Is the connector on the AMP 621410-6 cable assembly actually designed to directly plug into the back of the "P0" connector on the Wiener VME-64X Crates as had been planned ?

- If not then we have actually needed a Channel Link paddle card all along.

- Yes, the pin spacing is correct - but is all the plastic housing pin alignment stuff on these two parts setup to match ?

- I know nothing about these two connector families - but it looks to me like the connector on the AMP 621410-6 is NOT designed to plug directly into the back of the Wiener crate "P0".

- I do not understand the white plastic keying part on the AMP cable connector and I do not know which side of the Wiener "P0" backplane connector it should be on.

- A lot of the AMP cables that I see laying around in the sidewalk L1 Cal Trig development area have broken off white plastic keying parts.

- Playing at my desk with an 2mm x 2mm array of pins and an AMP Cable, it is clear that the plastic parts on the sides of the AMP 621410-6 cable connectors interfere with the Z and F column pins on the backplane connector. I do NOT think that these connectors are meant to go together. Yes, you can force them together by bending the Z and F column backplane pins.

The connector for the Channel Link signals at the back of the new Paddle Card must not be a significant impedance bump or else it will distort the high frequency Channel Link signals.

- At the signaling rate used and after the trace run on a full length Paddle Card this cable connector will appear after a significant fraction of a wavelength from the transmitter chips. It has the potential to cause real trouble.

- The transmitters are current mode so they have a reflection coefficient of +1. Whatever signal gets bounced back to them by the paddle card to cable connector pair will not be absorbed

by "back termination".

- We need to think not only about the 425 MHz basic rate but also about the frequency components in the 200 psec edges to keep the eye pattern open at the TAB receivers.

- The layout of the AMP cable assembly determined the connector pinout that was selected for "P0". The resulting pinout has path length differences between the two sides of a given differential pair. Thus every time these signals go through another one of these connectors there is additional distortion. (Rotating the pinout 90 degrees results in path length differences between pairs (not within pairs) which the Channel Link Receiver can compensate for.)

- I see no indication that the connectors on these AMP cable assemblies (or their pcb mounted counter parts) are constant impedance.

- As the Channel Link signals go through these cable connector pcb connector pairs there is no shielding or organization of the signals into differential pairs. In this connector system the coupling of one signal from a given differential pair is as strong to its neighbor pairs as it is to its complement in its own pair.

I assume that the new Channel Link + BLS signal Paddle Card will need to be a multi layer card, i.e. much fancier than the current 2 layer BLS only short paddle card.

- I assume that VLDS signals will "dual track" between 2 mm pins to escape the connector foot pint. The 5 column connector will thus require at least 2 of these dual track signal layers.

- The multi layer design of the new Channel Link + BLS signal Paddle card will allow a much cleaner differential layout of the BLS analog signals than was possible in the 2 sided layout of the initial BLS only short paddle card. The BLS analog signals can be shielded and organized into differential pairs.

- On the new full paddle card I assume that the Ground Planes will be sliced between the "P0" Channel Link circuits and the "P2" BLS analog circuits.

The way that the AMP 621410-6 cable assemblies are packaged is to fold them in half and then coil them up. Casual un-rolling of these cables results in a tight kink near the center of each differential cable pair. You can see examples of this kink in the cables laying around in the sidewalk L1 Cal Trig development area. We must be very careful when unrolling these cables.

I know that we did not check any data from ADF to TAB during tests last week so we basically have not yet proven that the ADF to TAB "pin to pin connectivity" is correct. We could just use an Ohm meter and check this to verify that there are no pinout surprises facing us that need to be taken care of in the Paddle Card wiring.

If the detailed mechanical design of the full new Channel Link + BLS Paddle Card is going to take a long time to develop (because of questions about the supporting card guides or whatever), should we push for a quick early "Channel Link Only" paddle card so that we can verify its electrical and connector issues ? This card could be the full expected length of the new Channel Link + BLS paddle card but just tall enough to cover "P0". We could just hang it in place for electrical tests. The big advantage of already having the BLS only paddle card is that we know exactly how the BLS "P2" part of the new full Channel Link + BLS paddle card needs to be wired up.

All of the 8 pair LVDS cables that I received from Saclay when MSU took over the ADF production are made by ERNI not by AMP. They are quite different from the AMP 621410-6 cable assemblies.

- They clearly do plug into the back of the "P0" connector on the Wiener backplanes.

- The cable shields, besides connecting to column C pin grounds also connect to column Z and F pin grounds.

- There is a metal plate between each row of pins in this connector which:
  connects to the pins in columns Z C and F of that row

  connects to the cable shields

provides isolation between rows

provides a ground plane for the signals to run over
and thus is a step toward a constant impedance connector.

- I believe that these are ERNI part number 124955.
  The tag on them says "ERNI 0330 LT001 124955".
  They come coiled up in sacks and do not kink when unrolled.

- Originally did Saclay think that this is the cable that was going
  to be used and Columbia think that the AMP 621410-6 cable was going
  to be used ? MSU was not part of this design and I do not know.
  The cables are quite different.

- We really could benefit from someone who has experience with
  these different LVDS cables, and AMP Z-PACK connectors, and VIPA
  VME-64X "P0", and Harting and ERNI parts. This stuff is all
  new to me.

Is the expense of the new Channel Link + BLS Paddle Card going to
be enough money that we need to give upper management a call.
Order of magnitude cost for each paddle card is: ?
20 per ADF Crate x 4 ADF Crates + 10 spare = 90 paddle cards.